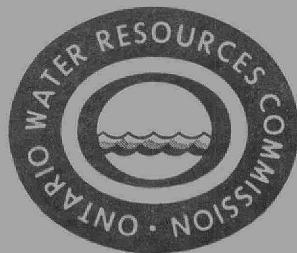
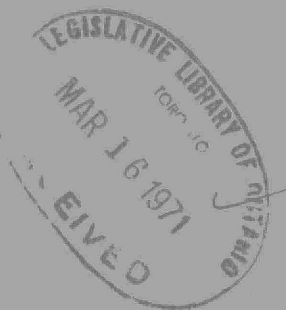


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*O.W.R.C.
Water Pollution
Survey*



THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

TOWN OF NEWMARKET

COUNTY OF YORK

1970

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REPORT

on a

Water Pollution Survey

of the

TOWN OF NEWMARKET

County of York

1970

District Engineers Branch
Division of Sanitary Engineering

CADON
WR 610
1970
No 81

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R E P O R T

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A water pollution survey of the Town of Newmarket was made during June and October 1970. The purpose of the survey was to locate and record all significant sources of water pollution within the Newmarket area and to make recommendations on the most feasible method of correcting them.

I GENERAL

The Town of Newmarket is located approximately 28 miles north of Toronto on Highway 11. The new town limits are contained within a rectangle formed by the fourth lot north of Davis Drive on the north, and the first lot north of St. Johns Sideroad on the south, and approximately 150 feet west of the proposed Highway 404 on the east, and the centre line of Bathurst Street on the west. The population for Newmarket was assessed in 1969 to be 9,904 persons but due to the new enlarged boundaries the population will increase by approximately 6,000. The new boundaries became official on January 1, 1971.

(i) Drainage

Drainage for the Town of Newmarket is provided

by storm sewers and roadside ditches which eventually discharge into the Holland River and Bogart Creek or their tributaries. Stream "C" (see enclosed map) which provides drainage for the western portion of the town also drains approximately 700 acres in the Township of King. In the eastern section of the town drainage is provided by Stream "E" (see enclosed map) which also drains approximately 100 to 200 acres in the Township of Whitchurch.

(ii) Water Supply

The town is served by five wells:

Water Street well,
Cotter Street well,
Srigley Street well,
Yonge Street wells #1 & #2.

The reported capacity of the system is approximately 1,525 gpm or 2.2 MGD. The total pumpage for 1969 was 321,277,100 gallons and the average per capita per day pumpage was 88.0 gallons based on a population of 10,000 persons. A new well and a 500,000 gallon elevated storage tank are being developed.

The Technical Advisory Services Branch of the OWRC have completed their study of the Newmarket well water. The study states that the well water is treatable by silica (as SiO_2) and chlorination. The

purpose of silica treatment in well water is to control iron precipitation. If iron does precipitate in a distribution system taste and odour problems can occur as well as the staining of plumbing fixtures and clothing.

Eighty water samples were collected in 1969 and all indicated satisfactory bacteriological water quality.

II WASTE DISPOSAL FACILITIES

(i) Municipal Sewage Treatment Plant

The majority of the built up sections of the town are served by separate sewers. The average flow during 1969 was 1.68 MGD and the average BOD per day was 3290 lbs. which was 84 and 75 per cent respectively of the design capacity of the sewage treatment plant. The estimated population serviced by sewers is approximately 14,000 which includes approximately 4,000 from East Gwillimbury. Based on these figures the average daily per capita sewage flow is 120 gallons and the average per capita BOD contribution is 0.24 lbs.

The average reductions of BOD and suspended solids concentrations for the plant are 96 per cent. Effluent BOD and suspended solids concentrations in

1969 were generally below 10 ppm and 12 ppm respectively.

Based on the 1969 flow and effluent quality figures it can be calculated that the average BOD loading to the Holland River from this plant was approximately 108 lbs. per day.

In November 1968, the Holland River Conservation Authority reactivated an old dam about two miles downstream from the plant. This dam caused a back-up of water as far as the Newmarket plant. The dam reduced flow velocities, the re-aeration characteristics and the natural purifying capability of the stream. It is estimated that the waste load input at Newmarket should probably not exceed 100 lbs. BOD per day from May to October when stream flows are lowest and water temperatures are highest. The BOD limitation is based on information obtained in the OWRC Report "A Water Use Study of the Holland River Basin (1969)".

Construction of the experimental full scale phosphorus removal facilities for the Newmarket plant are almost completed. The Research Branch of the OWRC is financing the project and the experimental work is designed to provide more information on various phosphorus removal methods.

(ii) Private Waste Disposal Systems

One area not served by sewage facilities

is in the south-east portion of the town. This portion utilizes septic tanks and is comprised roughly of 50 lots on Stewart, Cedarwood, Sutherland and Allen Avenues and a section of Maple Street. Other areas not served by sewers are portions of the annexed land.

(iii) Industrial Waste Disposal

There have been problems in the past with waste from industries in the Newmarket area. The Industrial Waste Division of the OWRC has had these problems alleviated to their satisfaction and still maintain routine inspection on some of the industries.

Glenville Farms Dairy Limited and Office Speciality along with other industries discharge their wastes into the municipal sewerage system.

III FIELD SURVEY

(i) Observations

Sewage was observed seeping from a bridge abutment (HB-13.95-W1) at the intersection of Queen Street and Bogart Creek. The York County Health Unit dye tested several houses in the vicinity. The dye testing indicated that six homes had no connections to either the municipal sewer or to any septic tank system.

One area which appears to drain poorly is

the ditch adjacent to Scott Avenue (SD-15.28). This ditch receives the backwash effluent from the water softeners, drainage from the eaves troughs and the water used to wash the boiler room floors at the Green Acres Home for the Aged. The chemical analysis of a water sample taken at a ditch adjacent to the home contained iron and phosphorus (P) concentrations of .2 ppm and 1.2 ppm respectively. There was a rusty colour observed on the bottom of the ditch along with a greenish slime.

The section of the Holland River just beneath the falls at Water Street (H-14.34) should be kept free of debris. Another section of the Holland River which needs to be cleaned of debris is north of Davis Drive.

A creek flowing from a culvert at Eagle Street (SD-14.49) forms a pond before it flows to the Holland River (Fairy Lake). The surface of the ponded area was partly covered with what appears to be duckweed (lemna minor) an emergent aquatic plant.

(ii) Sample Results

The laboratory results of the bacteriological examinations and the chemical analysis of samples collected from the watercourses and outfalls, are

included in the tables appended to this report.

Generally, the faecal and total coliform counts were quite high for a town which is sewered. The majority of the coliform counts from samples taken throughout the town fluctuate from high to low and vice versa which is indicative of intermittent impairment. Some of the areas which appear to have consistently high coliform counts are evident by the results of samples taken at points:

- SD-14.49 - coliform counts of 11,000 and 24,000 per 100 ml were obtained at the discharge point of Stream "D".
- SC-14.00 - approximately 675 feet from the discharge point of Stream "C", the coliform counts were 120,000 and 36,000 per 100 ml.

Samples taken at storm sewer outfall points HB-13.95-W and H-13.92-W contained high faecal and total coliform counts. The high counts appear to be indicative of sewage entering the storm sewers possibly via illegal connections.

A sample of raw sewage which was seeping from a bridge abutment at the intersection of Queen Street and Bogart Creek (HB-13.95-W1) had a BOD of 180 ppm and total coliforms of 42×10^6 per 100 ml.

IV DISCUSSION

As mentioned previously in this report the

BOD loadings to the Holland River should not exceed 100 lbs. per day from May to October when the lowest flows occur in the river.

At the present time polishing of the final effluent will be required to ensure that no more than 100 pounds of BOD per day reaches the stream during low flow periods. The reserve capacity of the sewage treatment plant (2 MGD) will be taken up by the subdivisions already approved. Any further development in the Newmarket area will require changes or improvement to the flow characteristics and assimilation capabilities of the receiving stream.

There has been a proposal to create a conservation area at Pleasantville. The proposed dam at Pleasantville may provide some additional stream flow during dry periods as well as providing flood control.

The fluctuations of coliform counts in the watercourses throughout the Town of Newmarket could possibly be attributed to sporadic flows from outfalls and storm sewers. During periods of heavy precipitation the flow velocity of the water in the storm sewers increases, thus causing a scouring action which tends to flush polluting material to a watercourse.

Information on weather conditions for the

Newmarket area was obtained from the weather station at Sharon. The precipitation recorded confirms moderate to heavy storm flows prior to days samples were taken.

June 16 - .30 inches October 12 - .03 inches

June 17 - .12 inches October 13 - .60 inches

V SUMMARY

This is a report on a water pollution survey of the Town of Newmarket.

Domestic water for the town is provided by five municipal wells, also a new well and elevated storage tank is planned.

Sanitary wastes are directed to a conventional activated sludge plant with final effluent discharging to the Holland River. Experimental full scale phosphorus removal facilities are almost completed at the sewage plant and the project was financed by the Research Division of the OWRC.

Subdivision development in the Newmarket - East Gwillimbury area should be controlled to prevent overloading of the sewage plant and the deterioration of the quality of the Holland River.

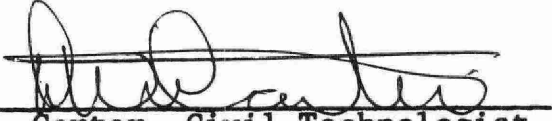
Adverse water samples taken at various sampling points indicate that sewage is entering storm sewers and watercourses. Therefore, the town should

initiate a program to correct these sources of pollution.

VI RECOMMENDATIONS

1. Future development should not outstrip the capacities of the water and sewerage services and the Holland River.
2. The town should initiate a programme encompassing the following:
 - (i) periodic cleaning of sewers,
 - (ii) checking the sewers for illegal relief overflow and down-spout connections,
 - (iii) dye testing houses in the vicinity of sampling points that have high coliform counts,
 - (iv) cleaning drainage ditches and watercourses which contain debris.
3. Green Acres Home for the Aged should direct the softener backwash effluent and the wash water from the boiler room to the sanitary sewer.

Prepared by:


D. W. Carter, Civil Technologist
District Engineers Branch
Division of Sanitary Engineering

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APPENDICES

GLOSSARY OF TERMS

Bacteriological Examinations - The Membrane Filter technique is used to obtain a direct enumeration of coliform organisms. These organisms are the normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large number in sewage and are, in general, relatively few in number in other stream pollutants. The results are reported as MF coliform count per 100 millilitres.

Biochemical Oxygen Demand (BOD) - The BOD test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in the sewage, sewage effluent, polluted waters or industrial wastes by aerobic biochemical action. The time and temperature used are 5 days and 20° C respectively.

Solids - The analyses for solids include tests for total, suspended and dissolved solids of organic or inorganic nature, whereas the dissolved solids are a measure of those solids in solution.

Alkyl Benzene Sulfonate (ABS) - The alkyl benzene sulfonate portion of the anionic detergents is reported in ppm. The test is generally employed to detect the presence of domestic wastes. The popular use of synthetic detergents for general cleaning purposes has resulted in the incidence of residual ABS in domestic waste discharges.

As an objective, the ABS concentration should not exceed 0.5 ppm in water used for domestic purposes.

Phosphorus

Total Phosphorus - Total Phosphorus is a measure of both the organic and inorganic forms of phosphorus present.

Soluble Phosphorus - Soluble Phosphorus is a measure of the orthophosphate only and when subtracted from the total phosphorus gives an indication of the concentration of organic phosphorus present. That is, the soluble phosphorus is a measure of the inorganic phosphorus present except the phosphorus in the form of polyphosphate, which however, in surface waters is usually insignificant. Inorganic phosphorus in concentration in excess of 0.01 ppm may cause nuisance conditions.

TOWN OF NEWMARKET

TABLE 1 - (HOLLAND RIVER)

SAMPLING POINT NUMBER	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS (PPM)			ABS	P	FE	COLIFORMS/100 ML	
				TOTAL	SUSP.	DISS.				TOTAL	FECAL
H-12.42	HOLLAND RIVER AT HERALD ROAD	JUNE 18	6.5	490	10	480				2100	360
		OCT. 14	4.5	510	20	485				3900	400
H-13.91	100 YD. NORTH OF DAVIS DRIVE (HOLLAND RIVER)	JUNE 18	5.0	460	10	450				8000	1460
		OCT. 14	4.0	480	10	470				2600	900
H-13.92-W	24" C.I.P. NORTH SIDE DAVIS DRIVE & HOLLAND RIVER	JUNE 18	6.5	2000	15	1985				5100	1300
		OCT. 14	12.0	930	165	765				190,000	20,000
H-13.94	BOGART CREEK & HOLLAND RIVER	JUNE 18	3.0	310	10	300				30,000	3000
		OCT. 14	3.0	460	10	450				1400	100
H-14.27	HOLLAND RIVER & R.R. BRIDGE	JUNE 18	6.0	500	40	460				9000	1190
		OCT. 14	4.0	500	10	490				1700	500
H-14.28-W	24" OUTFALL AT BRIDGE NEAR MEMORIAL ARENA	JUNE 18	3.5	650	5	645				37,000	4000
		OCT. 14	0.4	260	5	255				3400	1200
H-14.29	HOLLAND RIVER & TIMOTHY STREET	JUNE 18	5.5	500	10	490				3000	600
		OCT. 14	6.0	500	15	485				1900	700
H-14.34	HOLLAND RIVER & WATER STREET	JUNE 18	5.5	520	15	505				600	300
		OCT. 14	4.5	500	10	490				2100	600
H-15.40	HOLLAND RIVER & MULOCK DRIVE	JUNE 18	2.0	540	5	536				3500	390
		OCT. 14	7.0	480	25	455				11,000	3500

TOWN OF NEWMARKET

TABLE 11 - (BOGART CREEK)

SAMPLING POINT NUMBER	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS (PPM)			ABS	P	FE	COLIFORMS/100 ML	
				TOTAL	SUSP.	DISS.				TOTAL	FECAL
HB-13.95	BOGART CREEK AT QUEEN STREET	JUNE 18	3.0	330	10	320				6400	2400
		OCT. 14	1.4	310	5	305				1900	200
HB-13.95-W	12" OUTFALL, BOGART CREEK NORTH OF QUEEN	JUNE 18	3.5	670	10	660				88,000	4500
		OCT. 14	20	570	215	355				120,000	20,000
HB-13.95-WI	N.E. CORNER OF BRIDGE, BOGART CREEK & QUEEN STREET	JUNE 18	180	910	160	750				42 x 10 ⁶	19 x 10 ⁶
HB-14.29	BOGART CREEK & TIMOTHY STREET	JUNE 18	3.0	320	10	310				2700	700
		OCT. 14	1.6	320	5	315				1200	500
HB-14.39	BOGART CREEK & GORHAM STREET	JUNE 18	3.0	330	10	320				1600	500
		OCT. 14	1.4	320	5	315				1100	300
HB-14.96	BOGART CREEK & TOWN LIMITS	JUNE 18	3.0	320	10	310				1300	800
		OCT. 14	1.8	330	5	325				340	210

TOWN OF NEWMARKET

TABLE III - (STREAM "C")

SAMPLING POINT NUMBER	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS (PPM)			ABS	P	Fe	COLIFORMS/100 ML	
				TOTAL	SUSP.	DISS.				TOTAL	FECAL
SC-13.95	CREEK UNDER R.R. BRIDGE TO HOLLAND RIVER	JUNE 18	1.2	260	5	255				390	240
		OCT. 14	2.5	430	15	415				30,000	3800
SC-14.00	MAIN STREET & FRANKLIN STREET	JUNE 18	3.0	620	5	615				120,000	10,000
		OCT. 14	3.0	430	15	415				36,000	5000
SC-14.57	FOREST GLEN & QUEEN STREET	JUNE 18	1.8	550	5	545				5900	2200
		OCT. 14	1.6	710	15	695				3800	1800
SC-14.90	CREEK & PARK AVENUE	JUNE 18	2.0	1970	40	1930				7800	3600
		OCT. 14	10.	710	380	440				10,000	2200
SC-15.15	CREEK & LEWIS DRIVE	JUNE 18	2.0	640	10	630				50,000	6900
		OCT. 14	1.6	440	10	430				3600	700
SC-15.26	CREEK SOUTH OF LEWIS DRIVE	JUNE 18	1.8	610	15	595				40,000	5900
		OCT. 14	1.2	590	5	585				2900	300

TOWN OF NEWMARKET

TABLE IV - (STREAM "D")

SAMPLING POINT NUMBER	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS (PPM)			ABS	P	FE	COLIFORMS/100 ML	
				TOTAL	SUSP.	DISS.				TOTAL	FECAL
SD-14.44	HOLLAND RIVER	JUNE 18	6.0	500	15	485	0.2			4000	100
	& WILLIAM STREET	OCT. 14	5.0	550	60	490				37,000	5000
SD-14.49	WILLIAM STREET	JUNE 18	6.0	2270	50	2220				11,000	4700
	& EAGLE STREET	OCT. 14	7.0	520	30	490				24,000	4000
SD-15.28	CREEK	JUNE 18	6.0	920	20	900	0.9			120,000	1200
	SCOTT AVENUE	OCT. 14	2.0	450	10	440	0.2	1.1	.4	3400	2500
SD-15.29	12" OUTFALL GREEN ACRES	OCT. 14	2.0	300	5	295	.1	1.2	.20	12	4

TOWN OF NEWMARKET

TABLE V - (STREAM "E")

SAMPLING POINT NUMBER	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS (PPM)			ABS	P	FE	COLIFORMS/100 ML	
				TOTAL	SUSP.	DISS.				TOTAL	FECAL
SE-15.46	DAVIS DRIVE NEAR B.P. STATION	JUNE 18	5.0	580	15	565				12,200	4900
		OCT. 14	2.5	540	10	530				3800	500
SE-15.94	SPRIGLEY & ROXBOROUGH ROAD	JUNE 18	2.0	540	15	525				7300	730
		OCT. 14	2.5	540	10	530				1700	800



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- LEGEND**
- SE-15.46 - SAMPLING POINT SHOWING STREAM AND MILEAGE
 - H-14.28 - STREAM AND MILEAGE AT OUTFALL
 - W - TYPE OF OUTFALL
 - W - STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

TOWN OF NEWMARKET
(URBAN AREA)

WATER POLLUTION SURVEY
1970

SCALE: 500 0 500 1,000 FEET

DRAWN BY: A.R.S. DATE: FEB., 1971

CHECKED BY: DRAWING NO: 71-22-DE



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